General

Guideline Title

ACR Appropriateness Criteria® sudden onset of cold, painful leg.

Bibliographic Source(s)

Weiss CR, Azene EM, Majdalany BS, AbuRahma AF, Collins JD, Francois CJ, Gerhard-Herman MD, Gornik HL, Moriarty JM, Norton PT, Ptak T, Reis SP, Rybicki FJ, Kalva SP, Expert Panel on Vascular Imaging. ACR Appropriateness CriteriaÂ® sudden onset of cold, painful leg. Reston (VA): American College of Radiology (ACR); 2016. 8 p. [55 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Weiss C, Azene E, Rybicki FJ, Kim HS, Desjardins B, Fan CM, Flamm SD, Francois CJ, Gerhard-Herman MD, Kalva SP, Mansour MA, Mohler ER III, Oliva IB, Schenker MP, Expert Panel on Vascular Imaging. ACR Appropriateness Criteria® sudden onset of cold, painful leg. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 6 p. [50 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

ACR Appropriateness Criteria®

Clinical Condition: Sudden Onset of Cold, Painful Leg

Radiologic Procedure	Rating	Comments	RRL*
Arteriography lower extremity	8	This procedure is the preferred option if clinical suspicion of acute arterial obstruction is intermediate to high.	☢☢☢
CTA lower extremity with IV contrast	7	Consider in place of arteriography if clinical suspicion of arterial obstruction is low and patient has a stable baseline eGFR ≥45 mL/min.	☢☢☢
MRA lower extremity without and with IV contrast	7	This procedure is the preferred initial contrast dose. Consider prior to arteriography in patients with mild to	☢

Rating Scale: **1, 2, 3 Usually not appropriate; 4, 5, 6 May be appropriate; 7, 8, 9 Usually appropriate**

*Relative Radiation Level

Radiologic Procedure	Rating	Comments	RRL*
		moderate chronic kidney disease (GFR 30–89 mL/min).	
MRA lower extremity without IV contrast	5	This procedure should be considered in patients with eGFR <30 mL/min who are not yet on dialysis.	O
US duplex Doppler lower extremity	5	This procedure may be helpful for problem solving or targeted examinations (e.g., bypass graft).	O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

Introduction/Background

Acute onset of a cold painful leg, also known as acute limb ischemia (ALI), although not directly a significant cause of mortality, contributes significantly to morbidity. The etiologies are limited, the most common being arterial occlusion. Total venous outflow occlusion is another but much less common cause. It often results in what is known clinically as "phlegmasia cerulea dolens" (precursor to venous gangrene), with lower-extremity swelling, pain, and a dusky color. It is differentiated from arterial occlusion by the presence of distal arterial pulses. Other causes, such as prolonged exposure to cold and trauma, are rare and usually clinically obvious.

ALI generally requires urgent treatment. Appropriate care of the patient requires assessing the source (i.e., embolic versus thrombotic occlusion) and extent of the underlying arterial obstruction. The available diagnostic studies include invasive catheter angiography and noninvasive testing. Noninvasive imaging modalities include duplex ultrasound (US), magnetic resonance angiography (MRA), and computed tomography angiography (CTA).

The published literature on imaging of peripheral artery disease (PAD) focuses almost exclusively on patients with chronic PAD. This includes asymptomatic PAD, leg pain with exertion (i.e., intermittent claudication), and critical limb ischemia (CLI, defined as chronic leg or foot pain at rest, skin ulceration, or gangrene). By comparison, the literature focused on imaging patients with ALI is very limited. Consequently, the following discussion relies heavily on studies of patients with chronic PAD.

Arteriography

Arteriography (digital subtraction angiography [DSA]) performed with iodinated contrast material remains the diagnostic gold standard for detecting peripheral vascular occlusive disease. However, new and less invasive modalities are gradually replacing it. The ability to diagnose and treat disease in a single procedure is a major benefit of DSA that remains unmatched in the treatment of acute ischemic vascular disease. There has been extensive debate regarding the cost-benefit ratios when comparing DSA and MRA. Because of the invasive character of DSA, there is a recovery period typically lasting 4 hours or more. In some countries, patients remain in the hospital overnight. If complications from DSA occur, additional intervention and prolongation of the hospital stay may add cost as well as morbidity or even mortality. To be truly cost effective, any noninvasive method would have to supplant DSA, not just precede or supplement it.

The reported incidence of complications with DSA varies greatly. There are also risks associated with iodinated contrast materials. Most worrisome are the rare fatal systemic reactions and contrast-induced nephropathy. The nephrotoxic effects are important to consider as many patients who present with the sudden onset of a cold, painful leg are elderly, diabetic, and have impaired renal function. Carbon dioxide angiography or other imaging modalities that do not use iodinated contrast material should be considered in patients with estimated glomerular filtration rate (eGFR) <45 mL/min/1.73 m^2. Also, many patients will

have repeated catheter angiography over the course of their disease, and minimizing patient radiation exposure should always be considered. Angiography has also been criticized for its imperfect evaluation of outflow vessels, specifically for limited visualization of pedal vasculature and patent distal vessels beyond significant obstructive lesions.

Magnetic Resonance Angiography

MRA has high sensitivity and specificity for detecting arterial occlusive disease, using DSA as a gold standard. Early imaging protocols required 30 minutes or more of acquisition time. However, recent advances, including 3T magnetic fields, parallel imaging, multichannel coils, sequences such as time-resolved MRA, and enhanced acquisition speed, enable rapid assessment of ALI. In addition to decreased total examination times, faster acquisition reduces motion artifact and venous contamination. Motion artifact can also be corrected with automated image registration protocols. Improved spatial resolution translates to thinner slices and clearer depiction of small vessels. Most information needed for the interventional radiologist or vascular surgeon is routinely illustrated with MRA, such as a general road map of arterial anatomy, including runoff vessels and collaterals, as well as the location and extent of significant stenoses and occlusions.

Limitations include less accurate evaluation of smaller arteries, which means that more time-consuming sequences are required to get better results. Also, limited information can currently be obtained on a routine basis regarding the character of vessel walls and detailed flow dynamics, although time-resolved contrast-enhanced MRA techniques are beginning to provide qualitative flow information. Overestimation of stenosis has been reported in native arteries and in patients with vascular stents secondary to artifacts. Overestimation in native arteries varies among sequences and may or may not be a clinical problem in specific cases. This uncertainty highlights the poor consensus on optimal protocols. In part, this is a function of the continuing evolution of technology, both software and hardware.

Another concern with MRA is that most techniques have required the administration of a gadolinium-based contrast agent. However, MRA has few associated complications, with the realization of the risk of nephrogenic systemic fibrosis (NSF) in patients with underlying renal dysfunction who receive these contrast materials. There has been increased interest in using other modalities or limiting the use of gadolinium-based contrast material in such patients. Significantly lower contrast doses can be used at 3T compared to 1.5T without compromising image quality. Noncontrast MRA may prove useful. However, further improvements will be required, particularly in techniques for assessing pedal circulation. Finally, blood-pool gadolinium-chelate contrast agents have prolonged retention in the intravascular space and allow for steady-state imaging that, in turn, can enable high spatial resolution acquisitions. Additional studies will be needed to confirm potential clinical benefits and cost-effectiveness of such agents.

Computed Tomography Angiography

Multidetector-row technology has dramatically shortened CT acquisition times, improved spatial resolution, and improved vascular image quality depicted with CT. Multidetector CT (MDCT) scanners can image from the diaphragm to the ankles in <30 seconds using a single-contrast bolus. The use of 64-row or greater MDCT significantly increases the accuracy of stenosis detection, particularly in smaller vessels. Dynamic, time-resolved "4-D" CTA may improve accuracy even further. However, additional studies are needed before this can be confirmed.

Sophisticated postprocessing tools enable multiplanar visualization in all 3 orthogonal axes as well as in any oblique axis. In addition to multiplanar reconstructions, both volume rendering and maximum-intensity projections can be used, each with advantages and disadvantages. Maximum-intensity projections are very accurate for larger vessels (as distal as the infrapopliteal region) but less accurate for smaller vessels. Volume rendering, including endoluminal reconstruction, is good for evaluating embolic or vascular endothelial injury. It is also valuable in evaluating heavily calcified vessels. However, interpretation from volume-rendered images or maximum-intensity projections alone is insufficient to characterize vascular lesions and should always be accompanied by an assessment of the raw axial dataset and multiplanar reformatted images.

CTA has proven comparably accurate to MRA in evaluating peripheral arterial diseases. The advantages of CTA over MRA are its excellent spatial resolution, widespread availability, cost-effectiveness, and usability in patients who have contraindications to MRI, such as those who have pacemakers or defibrillators.

One disadvantage of CTA is the limited ability to depict the lumen in heavily calcified arteries. Calcium-induced artifact causes an overestimation of stenosis. In theory, dual-energy or spectral CTA can provide image reconstructions at various x-ray energy levels and can be used to distinguish between vascular calcium and iodinated contrast material. Initial studies have shown improved accuracy of stenosis detection and grading with dual-energy CTA compared to conventional CTA. However, early studies also suggest dual-energy CTA may still overestimate high-grade vessel stenosis as occlusion. Dual-energy CTA may also correlate less well with DSA in calcified calf and pedal arteries. Expanded clinical use of dual-energy CTA will require further validation and assessment of relative radiation doses.

Complications related to iodinated contrast are similar to those in catheter-based angiography and have been discussed above. Cumulative radiation dose is also a concern; CTA has been increasingly used for both preprocedural planning and postprocedure surveillance. Recent advances in hardware and software, however, have achieved lower radiation dosages for a single CTA examination. Also, techniques tailored to the evaluation of lower-limb vasculature have been published that allow reduced patient radiation by decreasing kVp, while preserving the ability to evaluate the smaller lower-limb vessels. Decreasing kVp also has the added advantage of allowing lower doses of iodinated contrast as kVp approaches the iodine K-edge.

Ultrasound Duplex Doppler

In this patient population, duplex US is limited by the need for operator expertise, by poor accessibility of vessels, by heavy calcification, and often by poor overall accuracy if multilevel disease is present. Its advantages are that it can provide useful physiologic as well as anatomic information. Further, it is noninvasive, widely available, and relatively inexpensive.

Echocardiography

Transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) are generally not part of the initial workup but may be useful if patient symptoms could be from cardiac embolization, particularly in patients with known atrial fibrillation. TEE is more invasive and time-consuming than TTE but affords better visualization of the left atrium. TEE may be useful to look for sources of emboli when TTE is indeterminate.

In the acute setting, however, this knowledge is unlikely to influence the immediate evaluation. Similarly, cardiac CT or MRI may identify or exclude cardiac thrombus or areas of cardiac dysfunction that might be the source of emboli, but this knowledge is not likely to have clinical impact in the acute setting.

Noninvasive Physiologic Testing

Noninvasive physiologic testing includes measurement of ankle-brachial index (ABI), segmental blood pressures, Doppler waveforms, handheld Doppler, pulse-volume recordings, transcutaneous oxygen pressure measurement ($TcPO_2$), and exercise treadmill testing. Segmental studies, $TcPO_2$, and exercise treadmill testing are of little use in the diagnosis and management of ALI. However, ABI measurement and handheld Doppler are simple, rapid, and reliable methods to confirm arterial occlusion as the etiology of sudden onset of cold leg when the cause is not obvious. Both ABI and handheld Doppler can also serve as objective baseline tests to follow the patient after intervention. Useful physiologic information may also be obtained. In this clinical setting, other noninvasive tests generally are not helpful as they do not provide specific information that will alter or guide therapy.

Summary

> Arteriography (DSA) remains the gold standard for diagnosing acute limb ischemia and continues to be the only modality that allows diagnosis and simultaneous treatment of pathology. This advantage

alone will ensure that it continues to be a valuable tool.
Noninvasive imaging with MRA or CTA before arteriography (DSA) or surgery is accepted and common. Both MRA and CTA can be used for diagnosis and may help surgical or interventional planning.
Other imaging and noninvasive physiologic testing may prove important for longer-term management but are less recommended in the acute setting.

Abbreviations

CTA, computed tomography angiography
eGFR, estimated glomerular filtration rate
GFR, glomerular filtration rate
IV, intravenous
MRA, magnetic resonance angiography
US, ultrasound

Relative Radiation Level Designations

Relative Radiation Level*	Adult Effective Dose Estimate Range	Pediatric Effective Dose Estimate Range
O	0 mSv	0 mSv
☢	<0.1 mSv	<0.03 mSv
☢☢	0.1-1 mSv	0.03-0.3 mSv
☢☢☢	1-10 mSv	0.3-3 mSv
☢☢☢☢	10-30 mSv	3-10 mSv
☢☢☢☢☢	30-100 mSv	10-30 mSv
*RRL assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (e.g., region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "Varies."		

Clinical Algorithm(s)

Algorithms were not developed from criteria guidelines.

Scope

Disease/Condition(s)

Sudden onset of cold, painful leg

Guideline Category

Diagnosis

Evaluation

Clinical Specialty

Emergency Medicine

Family Practice

Internal Medicine

Radiology

Intended Users

Advanced Practice Nurses

Health Plans

Hospitals

Managed Care Organizations

Physician Assistants

Physicians

Students

Utilization Management

Guideline Objective(s)

To evaluate the appropriateness of imaging procedures for sudden onset of cold, painful leg

Target Population

Patients with sudden onset of cold, painful leg

Interventions and Practices Considered

1. Arteriography, lower extremity
2. Computed tomography angiography (CTA), lower extremity with intravenous (IV) contrast
3. Magnetic resonance angiography (MRA), lower extremity
    - Without and with IV contrast
    - Without IV contrast
4. Ultrasound (US), lower extremity, duplex Doppler

Major Outcomes Considered

- Utility of imaging and physiologic testing procedures in differential diagnosis
- Sensitivity, specificity, accuracy, and diagnostic performance of imaging and physiologic testing procedures in the assessment of lower extremity arterial disease

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Summary

Of the 50 citations in the original bibliography, 45 were retained in the final document. Articles were removed from the original bibliography if they were more than 10 years old and did not contribute to the evidence or they were no longer cited in the revised narrative text.

A new literature search was conducted in May 2015 to identify additional evidence published since the *ACR Appropriateness Criteria® Sudden Onset of Cold, Painful Leg* topic was finalized. Using the search strategy described in the literature search companion (see the "Availability of Companion Documents" field), 221 articles were found. Eight articles were added to the bibliography. Two hundred thirteen articles were not used due to either poor study design, the articles were not relevant or generalizable to the topic, the results were unclear, misinterpreted, or biased, or the articles were already cited in the original bibliography.

The author added 1 citation from bibliographies, Web sites, or books that were not found in the new literature search.

One citation is a supporting document that was added by staff.

Number of Source Documents

Of the 50 citations in the original bibliography, 45 were retained in the final document. The new literature search conducted in May 2015 identified 8 articles that were added to the bibliography. The author added 1 citation from bibliographies, Web sites, or books that were not found in the new literature search. One citation is a supporting document that was added by staff.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Definitions of Study Quality Categories

Category 1 - The study is well-designed and accounts for common biases.

Category 2 - The study is moderately well-designed and accounts for most common biases.

Category 3 - The study has important study design limitations.

Category 4 - The study or source is not useful as primary evidence. The article may not be a clinical study, the study design is invalid, or conclusions are based on expert consensus.

> The study does not meet the criteria for or is not a hypothesis-based clinical study (e.g., a book chapter or case report or case series description);
>
> *Or*
>
> The study may synthesize and draw conclusions about several studies such as a literature review article or book chapter but is not primary evidence;
>
> *Or*

The study is an expert opinion or consensus document.

Category M - Meta-analysis studies are not rated for study quality using the study element method because the method is designed to evaluate individual studies only. An "M" for the study quality will indicate that the study quality has not been evaluated for the meta-analysis study.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The topic author assesses the literature then drafts or revises the narrative summarizing the evidence found in the literature. American College of Radiology (ACR) staff drafts an evidence table based on the analysis of the selected literature. These tables rate the study quality for each article included in the narrative.

The expert panel reviews the narrative, evidence table and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the variant table(s). Each individual panel member assigns a rating based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development document (see the "Availability of Companion Documents" field).

Methods Used to Formulate the Recommendations

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

Rating Appropriateness

The American College of Radiology (ACR) Appropriateness Criteria (AC) methodology is based on the RAND Appropriateness Method. The appropriateness ratings for each of the procedures or treatments included in the AC topics are determined using a modified Delphi method. A series of surveys are conducted to elicit each panelist's expert interpretation of the evidence, based on the available data, regarding the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario. The expert panel members review the evidence presented and assess the risks or harms of doing the procedure balanced with the benefits of performing the procedure. The direct or indirect costs of a procedure are not considered as a risk or harm when determining appropriateness. When the evidence for a specific topic and variant is uncertain or incomplete, expert opinion may supplement the available evidence or may be the sole source for assessing the appropriateness.

The appropriateness is represented on an ordinal scale that uses integers from 1 to 9 grouped into three categories: 1, 2, or 3 are in the category "usually not appropriate" where the harms of doing the procedure outweigh the benefits; and 7, 8, or 9 are in the category "usually appropriate" where the benefits of doing a procedure outweigh the harms or risks. The middle category, designated "may be appropriate," is represented by 4, 5, or 6 on the scale. The middle category is when the risks and benefits are equivocal or unclear, the dispersion of the individual ratings from the group median rating is too large (i.e., disagreement), the evidence is contradictory or unclear, or there are special circumstances or subpopulations which could influence the risks or benefits that are embedded in the variant.

The ratings assigned by each panel member are presented in a table displaying the frequency distribution of the ratings without identifying which members provided any particular rating. To determine the panel's recommendation, the rating category that contains the median group rating without disagreement is selected. This may be determined after either the first or second rating round. If there is disagreement after the second rating round, the recommendation is "May be appropriate."

This modified Delphi method enables each panelist to articulate his or her individual interpretations of the evidence or expert opinion without excessive influence from fellow panelists in a simple, standardized, and economical process. For additional information on the ratings process see the Rating Round Information document.

Additional methodology documents, including a more detailed explanation of the complete topic development process and all ACR AC topics can be found on the ACR Web site (see also the "Availability of Companion Documents" field).

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

- There has been extensive debate regarding the cost-benefit ratios when comparing digital subtraction angiography (DSA) and magnetic resonance angiography (MRA). Because of the invasive character of DSA, there is a recovery period typically lasting 4 hours or more. In some countries, patients remain in the hospital overnight. If complications from DSA occur, additional intervention and prolongation of the hospital stay may add cost as well as morbidity or even mortality. To be truly cost-effective, any noninvasive method would have to supplant DSA, not just precede or supplement it.
- The advantages of computed tomography angiography (CTA) over MRA are its excellent spatial resolution, widespread availability, cost-effectiveness, and usability in patients who have contraindications to magnetic resonance imaging (MRI), such as those who have pacemakers or defibrillators.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The recommendations are based on analysis of the current medical evidence literature and the application of the RAND/UCLA appropriateness method and expert panel consensus.

Summary of Evidence

Of the 55 references cited in the *ACR Appropriateness Criteria® Sudden Onset Cold, Painful Leg*

document, 48 are categorized as diagnostic references including 11 well designed studies, 22 good quality studies, and 8 quality studies that may have design limitations. Additionally, 4 references are categorized as therapeutic references including 1 good quality study, and 2 quality studies that may have design limitations. There are 8 references that may not be useful as primary evidence. There are 3 references that are meta-analysis studies.

While there are references that report on studies with design limitations, 34 well designed or good quality studies provide good evidence.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

The ability to diagnose and treat disease in a single procedure is a major benefit of digital subtraction angiography (DSA) that remains unmatched in the treatment of acute ischemic vascular disease.

Potential Harms

- Because of the invasive character of digital subtraction angiography (DSA), there is a recovery period typically lasting 4 hours or more. In some countries, patients remain in the hospital overnight. If complications from DSA occur, additional intervention and prolongation of the hospital stay may add cost as well as morbidity or even mortality.
- The reported incidence of complications with DSA varies greatly. There are also risks associated with iodinated contrast materials. Most worrisome are the rare fatal systemic reactions and contrast-induced nephropathy (CIN). The nephrotoxic effects of DSA are important to consider, as many patients who present with the sudden onset of a cold, painful leg are elderly, diabetic, and have impaired renal function. Also, many patients will have repeated catheter angiography over the course of their disease, and minimizing patient radiation exposure should always be considered.
- Cumulative radiation dose is also a concern with computed tomography angiography (CTA); CTA has been increasingly used for both preprocedural planning and postprocedural surveillance.

Relative Radiation Level Information

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, both because of organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared to those specified for adults. Additional information regarding radiation dose assessment for imaging examinations can be found in the ACR Appropriateness Criteria® Radiation Dose Assessment Introduction document (see the "Availability of Companion Documents" field).

Contraindications

Contraindications

Magnetic resonance imaging (MRI) is contraindicated in patients with pacemakers or defibrillators in place.

Qualifying Statements

Qualifying Statements

- The American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.
- ACR seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply individual or society endorsement of the final document.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Weiss CR, Azene EM, Majdalany BS, AbuRahma AF, Collins JD, Francois CJ, Gerhard-Herman MD, Gornik HL, Moriarty JM, Norton PT, Ptak T, Reis SP, Rybicki FJ, Kalva SP, Expert Panel on Vascular Imaging. ACR Appropriateness CriteriaÂ® sudden onset of cold, painful leg. Reston (VA): American College of Radiology (ACR); 2016. 8 p. [55 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016

Guideline Developer(s)

American College of Radiology - Medical Specialty Society

Source(s) of Funding

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

Guideline Committee

Committee on Appropriateness Criteria, Expert Panel on Vascular Imaging

Composition of Group That Authored the Guideline

Panel Members: Clifford R. Weiss, MD (*Principal Author*); Ezana M. Azene, MD, PhD (*Research Author*); Bill S. Majdalany, MD (*Panel Vice-chair*); Ali F. AbuRahma, MD; Jeremy D. Collins, MD; Christopher J. Francois, MD; Marie D. Gerhard-Herman, MD; Heather L. Gornik, MD; John M. Moriarty, MB, BCh; Patrick T. Norton, MD; Thomas Ptak, MD, PhD; Stephen P. Reis, MD; Frank J. Rybicki, MD, PhD (*Specialty Chair*); Sanjeeva P. Kalva, MD (*Panel Chair*)

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Weiss C, Azene E, Rybicki FJ, Kim HS, Desjardins B, Fan CM, Flamm SD, Francois CJ, Gerhard-Herman MD, Kalva SP, Mansour MA, Mohler ER III, Oliva IB, Schenker MP, Expert Panel on Vascular Imaging. ACR Appropriateness Criteria® sudden onset of cold, painful leg. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 6 p. [50 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the American College of Radiology (ACR) Web site .

Availability of Companion Documents

The following are available:

ACR Appropriateness Criteria®. Overview. Reston (VA): American College of Radiology; 2015 Oct. 3 p. Available from the American College of Radiology (ACR) Web site .

ACR Appropriateness Criteria®. Literature search process. Reston (VA): American College of Radiology; 2015 Feb. 1 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Evidence table development. Reston (VA): American College of Radiology; 2015 Nov. 5 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Topic development process. Reston (VA): American College of Radiology; 2015 Nov. 2 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Rating round information. Reston (VA): American College of Radiology; 2015 Apr. 5 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Radiation dose assessment introduction. Reston (VA): American College of Radiology; 2015 Sep. 3 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Manual on contrast media. Reston (VA): American College of Radiology; 2016. 128 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Procedure information. Reston (VA): American College of Radiology; 2016 May. 2 p. Available from the ACR Web site .

ACR Appropriateness Criteria® sudden onset of cold, painful leg. Evidence table. Reston (VA): American College of Radiology; 2016. 24 p. Available from the ACR Web site .

ACR Appropriateness Criteria® sudden onset of cold, painful leg. Literature search. Reston (VA): American College of Radiology; 2016. 2 p. Available from the ACR Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI on February 20, 2001. The information was verified by the guideline developer on March 14, 2001. This summary was updated by ECRI Institute on August 10, 2009. This summary was updated by ECRI Institute on December 17, 2010. This summary was updated by ECRI Institute on November 14, 2012. This summary was updated by ECRI Institute on September 29, 2016.

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